

BLULEAP.AI

Technology Portfolio

Hardware · Firmware · Edge AI · Cloud.

We build full-stack AIoT systems — and we ship our own.

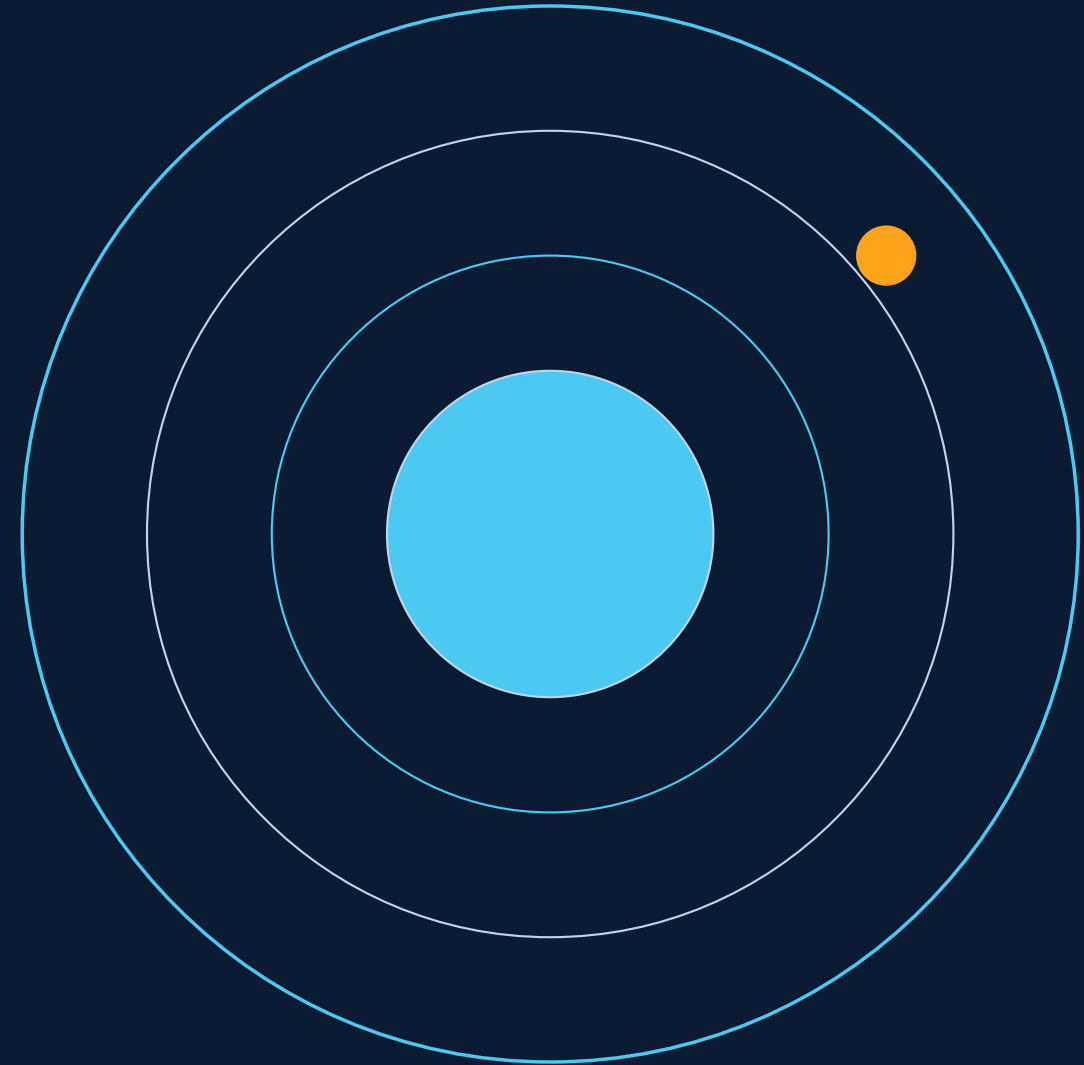
Robotics

Mobility & EV

Energy

Smart Consumer

Industrial IoT



Six engineers, one per layer of the stack

BluLeap designs and engineers hardware, firmware, edge AI, cloud and mobile for robotics, mobility, energy and smart consumer electronics.

13+

years of embedded engineering leadership

6

engineers, deliberately one deep per layer

4

countries — Singapore, Australia, Đà Nẵng, HCMC

5

own products in market or in build

WHAT THE SIX COVER

Hardware

Firmware

AI

Cloud

Backend

Mobile app

What that means for you

A small team with no gaps. Every layer of your product has a named owner who has shipped that layer before — so there is no integration seam where three vendors meet, and no discipline waiting on a hire. Twenty-plus hardware and firmware programmes delivered on that model.

Five layers, one supplier

Engage us for the whole stack, or drop us into the layer where your team is thin.

1 Hardware design

Sensors, cameras, actuators, MCUs and high-speed processors. Schematic, layout and DFM through to manufacturing.

2 Firmware & embedded software

RTOS and Linux/Android. Automotive depth: AUTOSAR, ADAS. Rust for safe, secure firmware.

3 Edge AI

TinyML and quantised vision at low power. LLM integration across the hardware and software stack.

4 Connectivity

MQTT, Zenoh, Wi-Fi, BLE, LoRa, NFC, LTE and CAN — chosen for the power and range budget, not by habit.

5 Cloud & backend

Scalable, real-time architecture. Time-series storage, processing and ML model integration.

6 Product & manufacturing

Certification, first-batch planning and supplier management — we have taken our own products through it.

What we actually build with

No exploratory learning on your budget — this is the stack we run every day.

Silicon

NXP i.MXRT

NXP i.MX8

ST STM32N6

ST STM32U0

Nordic nRF52840

NXP S32K

Operating systems

Zephyr RTOS

FreeRTOS

OSEK

Embedded Linux (Yocto)

Android Automotive

Languages & AI

Rust

C / C++

Embedded Rust

TinyML

Quantised vision (int8)

On-device LLM

Connectivity & cloud

CAN / CAN-FD

BLE & BLE Mesh

LoRa

MQTT

Zenoh

Wi-Fi 6

LTE

Time-series cloud

PART ONE

Products we own

We do not only build for clients. These are ours — designed, engineered, manufactured and sold by BluLeap.



Veea — the little camera that tells you what happened

Tell Veea what matters in your own words. It watches quietly, sends you a sentence the moment it happens, and deletes the photo seconds later.

1

Say it, don't configure it

No motion zones, no rule builders. “Tell me if the stove is left on.” “Watch the door while we're away.” Plain language in, a sentence out.

2

A diary, not a video feed

Every event becomes text. Ask when the plumber came and get an answer instead of an hour of scrubbing — plus daily summaries for helpers and elderly parents.

3

Voice mode

Talk to it like a housemate. Vietnamese, English and 100+ languages, through the camera speaker or the phone.



Working prototype · 38×38

HARDWARE & GO-TO-MARKET

On-device inference

Full HD · 160° lens

Wi-Fi 6

USB-C or 4×AAA

IP67

First batch early 2027

Not a render. This one is on the bench.

First physical prototype of the 66 mm shell — printed, assembled and running the vision pipeline.



Held in one hand — the size the industrial design was specified around

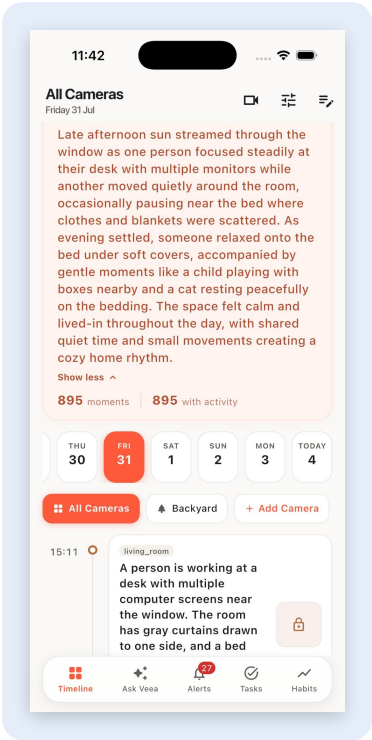


Front shell, lens barrel and status light, as assembled

A prototype in hand proves what CAD cannot: the enclosure closes, the optics clear the shell, the light pipe reads across a room, the thermals survive a real housing.

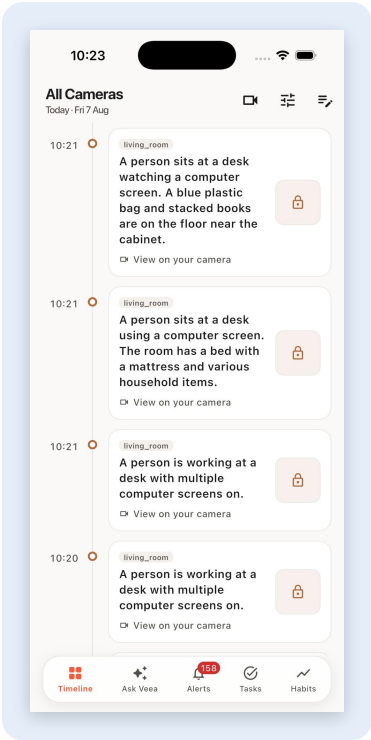
A diary of the day, not an hour of footage

Every event the camera sees becomes a sentence. The app is built around reading, not scrubbing.



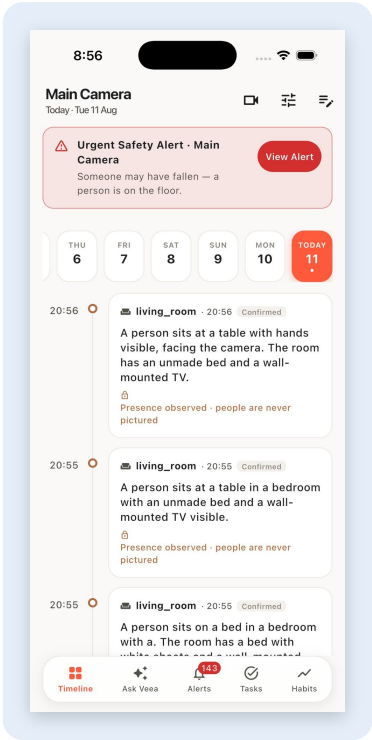
Written summaries

A day of activity condensed into a paragraph a person reads in ten seconds, with the moment count beside it.



Read by date, don't scrub

Pick a day and read what happened. No timeline slider, no 4x playback, no hunting for the moment.

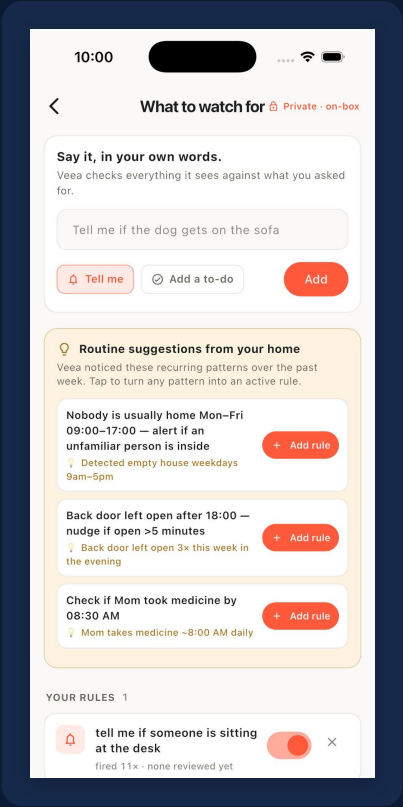


Alerts that say what is wrong

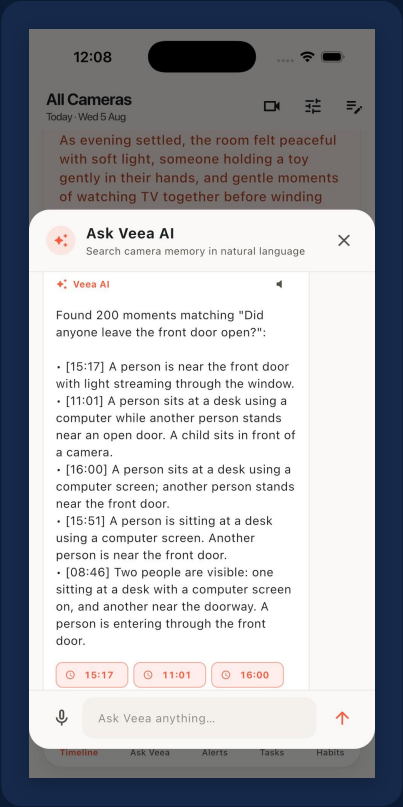
A possible fall surfaces as a sentence with one action attached — not a motion notification.

The interface is a sentence

No motion zones, no rule builders, no schedules. The user types what matters and the system does the rest.



Tell it what to watch for



Ask the camera memory a question

1

Rules in plain language

“Tell me if the dog gets on the sofa.” Every frame is checked against what the user asked for — no zones to draw.

2

Search over memory

“Did anyone leave the front door open?” returns matching moments with timestamps, across days, in seconds.

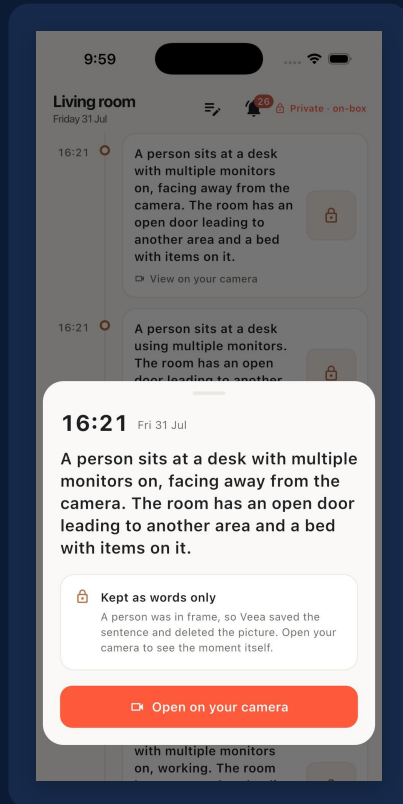
3

Patterns become suggestions

The system notices the back door is left open in the evening and offers to make it a rule.

Privacy built into the silicon, not the settings page

The reason a camera company can sell into living rooms — and the reference architecture we can build for you.



The user sees the rule being applied

1 Watches on the camera

A European secure chip reads every frame on the device. Quiet moments never leave the home.

2 Deleted in seconds

Only event snapshots reach the cloud. They become a sentence, then they are gone.

3 People never stored

Veeva keeps words, not faces. Images of people are never saved — not in the cloud, not on the device.

4 Identity in every unit

A tamper-proof identity chip per camera. Only your cameras talk to your account. Data stays in Singapore.

A light that never lies

Off means private. A slow coral breath means watching. A double pulse means Veeva messaged you — verifiable from across the room, no app required.

Veea English — vocabulary that follows your real work

A personal English companion for professionals: capture the words you actually meet at work, then keep them.

1

Capture where you read

Desktop OS-level word capture and in-app entry — a word goes in at the moment you meet it, not in a study session later.

2

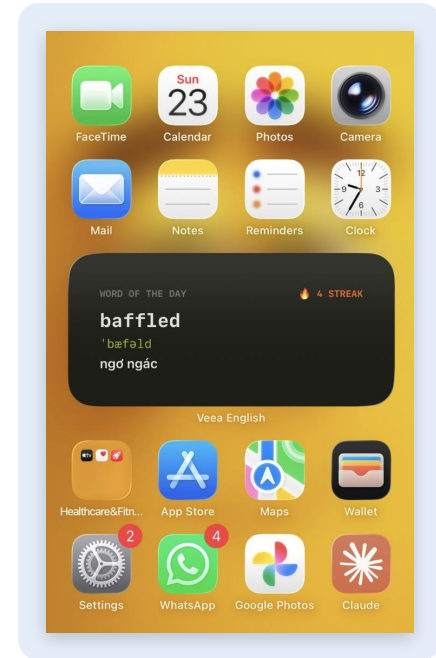
AI enrichment

Synonyms, antonyms, usage in context and memory images generated per word, so a word arrives already learnable.

3

Spaced repetition

Review scheduling built on the words you personally collected, not a generic frequency list.



Word of the day, on the home screen

STACK

Flutter / Dart

Rust backend

SQLite

BLE GATT

Spaced repetition

On-device

Designed for the display it is going to run on

The app's interface was drawn for e-ink first — so the keychain is a port, not a redesign.



Today's words — monospaced, high contrast

1 An e-ink-native interface

High contrast, monospaced type and no reliance on colour. It reads the same on a phone at full brightness and on a passive display with no backlight at all.

2 The keychain

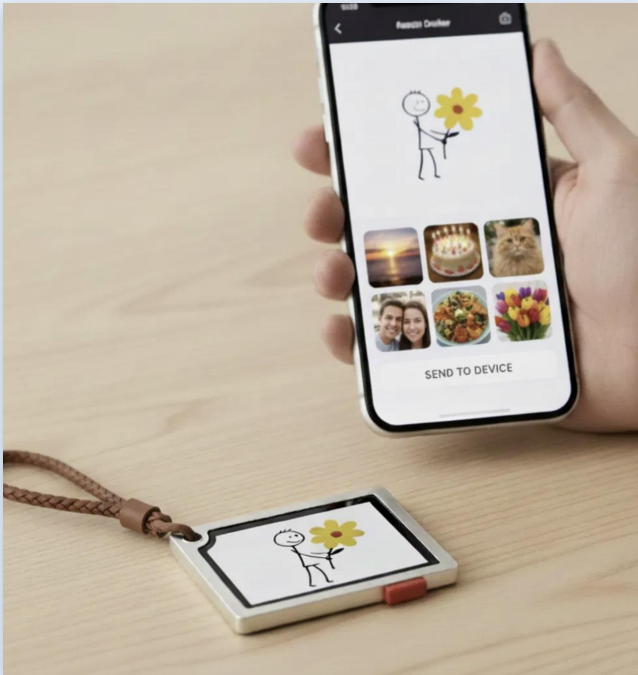
1.54" e-ink, Nordic nRF52, BLE sync to the phone only — no cloud path. Weeks of battery from an always-on display.

3 Why it works as a product

A word you meet at work goes in once and then keeps surfacing — lock screen, home widget, keychain — until it sticks. Free / Pro / hardware-bundle tiers.

Veea E-ink Tracking Tag

A Zephyr-based e-ink tag: custom GATT services, an on-phone image pipeline, and both major finding networks.



Industrial design concept — target form factor



Working driver board and 24-pin flex to the panel

1 Custom GATT for reliable sync

Purpose-built GATT services for high-reliability mobile sync, tuned for intermittent connections rather than lab conditions.

2 Image pipeline on the phone

Dither and pack a photo to the panel's native format on-device, then stream it in chunks with a commit handshake.

3 Apple Find My and Google Find Hub

Third-party tracking protocol integration on both ecosystems, meeting their security and performance compliance bars.

STACK

Zephyr RTOS

BLE GATT

Apple Find My

Google Find Hub

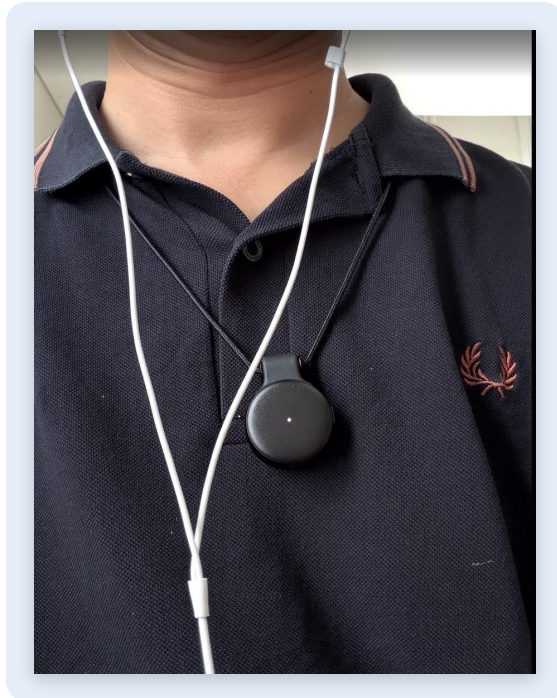
E-ink

Seeed XIAO nRF52840

github.com/bluleap-ai/the-tag

Veea Wearable — an AI that remembers for you

An always-on memory capture pendant, powered by what you said and heard. One body, four ways to wear it.



Worn prototype — pendant mode



Industrial design study — colourways and wear modes

STACK

Always-on audio

BLE

Low-power MCU

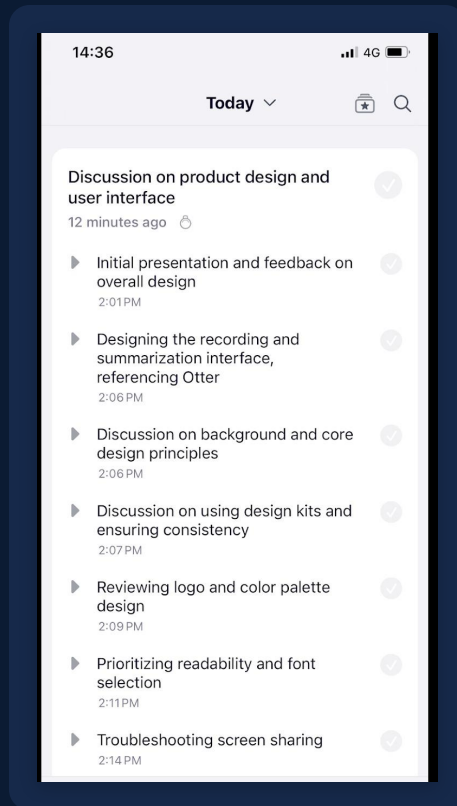
Cloud transcription

On-device wake control

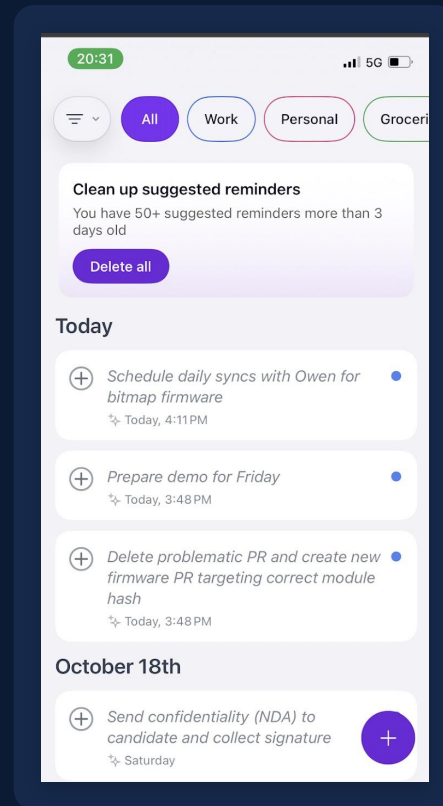
Multi-day battery

Audio in, decisions out

Capture is the easy half. The product is what comes back: a structured record and a task list you did not type.



Meetings, segmented and timestamped



Action items, extracted automatically

1 Structured, not a transcript wall

A conversation is broken into topics with timestamps — reviewable in seconds instead of replayed in full.

2 Commitments become tasks

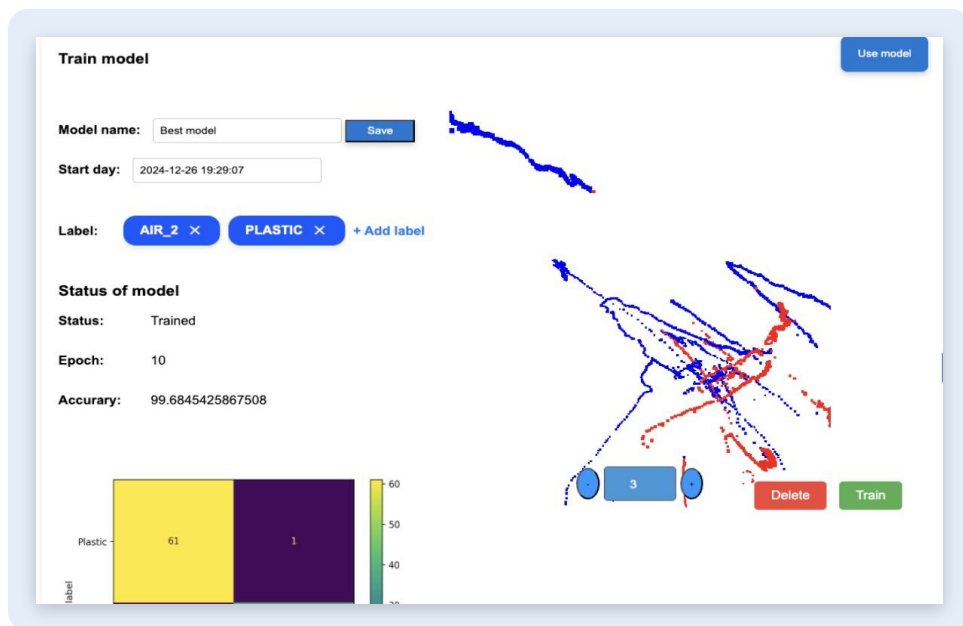
The system pulls out what was agreed and files it as a dated reminder, so the follow-through does not depend on memory.

3 Built end to end

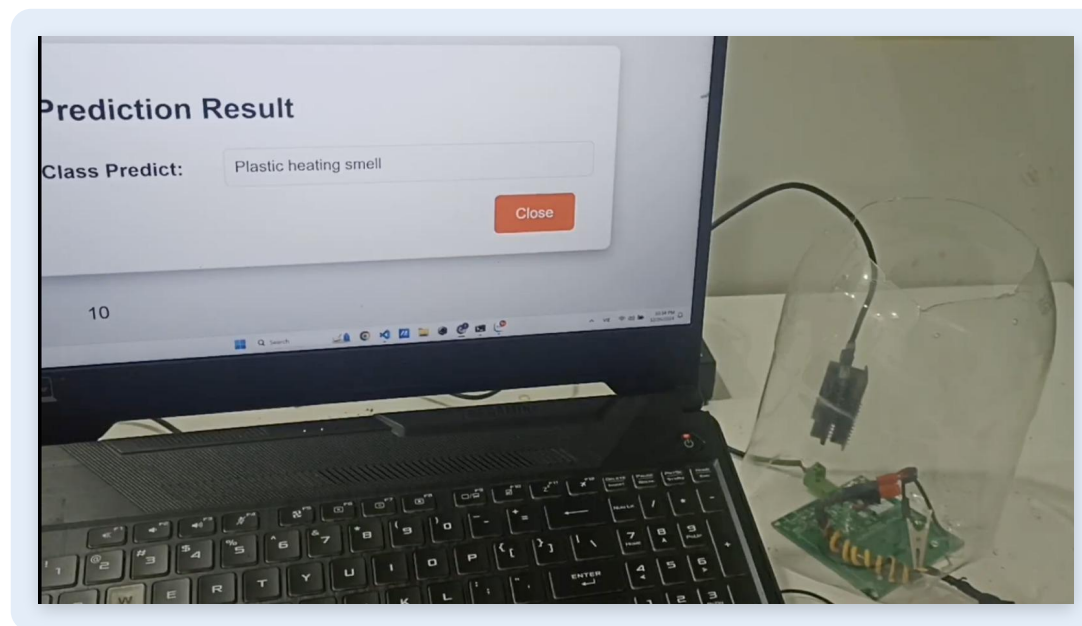
Enclosure, board, firmware, BLE link, backend and mobile app — all designed in-house, which is what makes the loop this short.

Smell-based early fire detection

Our own safety product. Conventional alarms wait for smoke and heat; we train on the odour of overheating plastic and wire — the signal that arrives first.



Training tool — label, train, inspect the confusion matrix



Live bench classification of a heating-plastic sample

1 Sense the odour, not the smoke

Custom gas sensors sample the air in high-risk spaces — electrical cabinets, EV charging bays, warehouses.

2 Classify at the edge

Inference runs on-device; nodes mesh to each other and to a local AI hub over Bluetooth mesh, with OTA model updates.

3 Retrofit, don't replace

Alerts feed people and existing fire alarm installations. Top 16, AI Việt Innovation 2024.

PART TWO

Built for clients

Selected programmes across robotics, mobility, energy, industrial and consumer hardware.

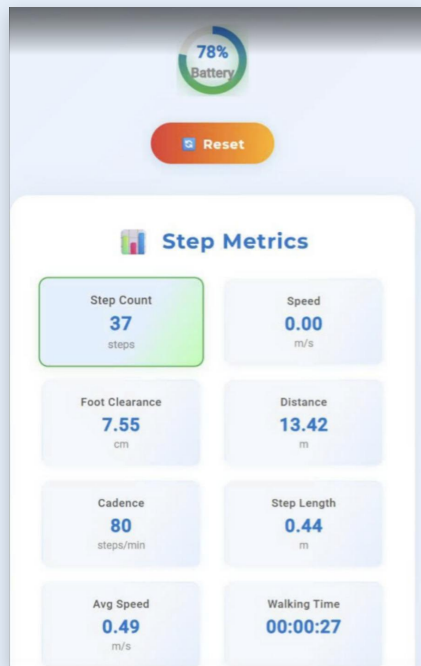


Wearable AI for gait and motion tracking

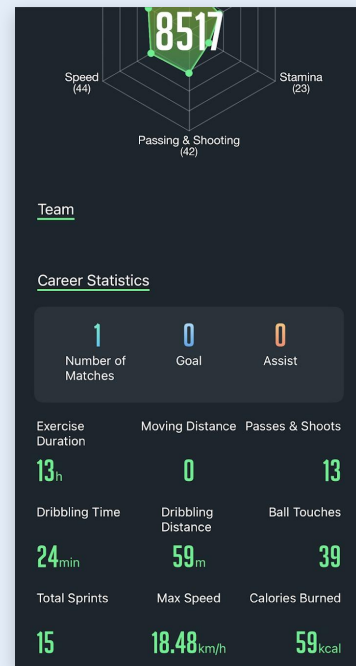
Hardware, firmware and on-device AI for a bio-motion system — one sensor stack serving clinical gait metrics and sports performance.



Ankle-mounted prototype



Gait metrics, live



Sports performance view

1 Hardware

Compact, low-power board with accelerometers, gyros and health sensors in an ultra-light form factor, strapped where the gait signal actually is.

2 Firmware

Optimised C/C++ on ARM MCU with a BLE stack for phone sync, real-time logging, power management and OTA.

3 Edge AI

On-device motion classification deriving cadence, step length, foot clearance and speed from raw IMU — not just a step count.

STACK

Nordic nRF52840

Bosch 9-axis IMU

BLE

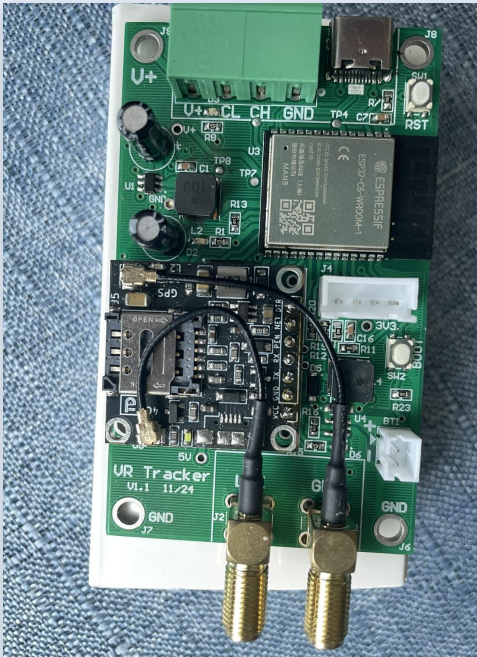
OTA

Edge inference

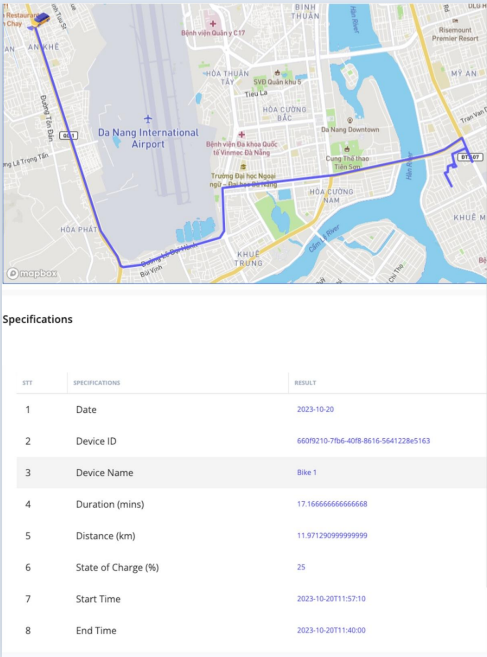
C / C++

Open-source telematics platform

Our own tracker hardware and cloud stack, published as open source — deployed on fleet and robotic units.



Tracker board — ESP32, cellular and GNSS



Trip replay and per-ride telemetry in the dashboard

- 1

Board we designed

ESP32 with a cellular modem, GNSS, dual SMA antennas, USB-C and a screw-terminal vehicle harness — sized to sit on a bike, not a bench.
- 2

Real-time CAN to cloud

CAN data and GNSS position forwarded live over MQTT, with OTA firmware delivery to ECUs across the CAN network, rollback included.
- 3

Trip-level telemetry

Every ride resolved into a replayable route with duration, distance and state of charge — plus crash and fall detection with immediate alerts.

STACK

ESP32

LTE

GNSS

CAN / CAN-FD

MQTT

OTA over CAN

github.com/bluleap-ai/telematic-esp32

Transformer fault detector with integrated gateway

Detect and re-energise failed distribution transformers remotely, without sending a truck out first.



Deployment: module mounted on the transformer



DVT hardware — main board and ADC daughterboard

1 Remote fault detection

Detect a failed transformer and re-energise it remotely, cutting the response loop from a truck roll to a command.

2 Two boards, one enclosure

A dedicated ADC daughterboard carries the analog front end; the main board handles compute, isolated rails and backhaul.

3 Condition monitoring at the edge

Continuous condition data with remote diagnostics over MQTT, on NXP i.MXRT dual-core running Zephyr.

STACK

NXP i.MXRT dual-core

Zephyr RTOS

Isolated DC-DC rails

Cellular + Wi-Fi/BLE

MQTT

Sealed field connectors

ADAS box for mass-market vehicles

Advanced driver assistance for budget cars, taxis and buses — features that used to be reserved for premium trims.

1 Edge vision, no vehicle surgery

On-device object detection over a dash camera feed, designed for rapid deployment without touching the vehicle's core systems.

2 The safety set

Overspeed detection and warning, forward collision warning, and detection of vehicles, pedestrians and obstacles.

3 Real-time overlay

Alerts rendered live over the camera feed so the driver sees the reason for the warning, not just the warning.

Why it matters

- Retrofit market is far larger than OEM
- Runs entirely on the edge — no data plan needed
- Shipped 2020; the vision stack still underpins our edge AI work

STACK

Edge object detection

Computer vision

Real-time overlay

Retrofit

In-vehicle HMI on custom Linux

Hardware and software for an automotive human-machine interface — from a display on the bench to a cluster in the dash.



Bring-up rig — panel, carrier board and bench supply



Cluster UI running in the enclosure

1 A platform we own

NXP i.MX8x on a custom Linux built with Yocto — a board support package we control end to end, boot and device tree included.

2 Modern UI, automotive base

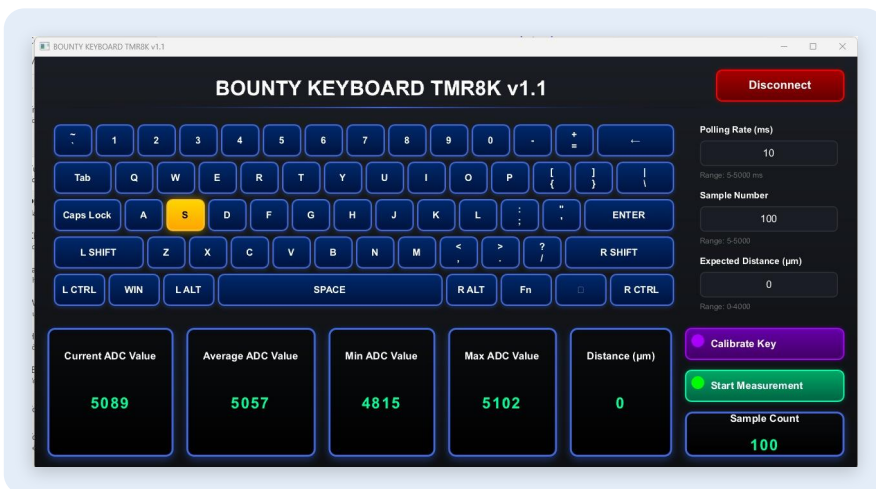
Toyota Connected's Flutter IVI homescreen and Sony's embedded Flutter for Linux, kept upstream-aligned rather than forked into a corner.

3 Hardware and UI specified together

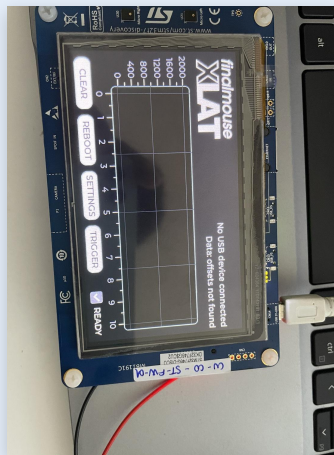
Display, touch and compute chosen against one latency target, so the interface that ships behaves like the one designed.

8 kHz analog input, measured not assumed

Firmware for high-polling-rate analog-switch keyboards — and the two measurement rigs that prove the numbers.



Our characterisation tool — per-key ADC and calibration



XLAT click-to-photon rig

1 Analog signal chain

Per-key ADC acquisition with individual calibration curves, drift compensation and hysteresis — travel resolved to microns, not a binary press.

2 Deterministic 8 kHz path

A 125 μ s report budget end to end: scan, filter, decide, report. The work is in bounding jitter, not hitting the average.

3 Two measurement paths

Our own Rust and Slint tool for per-key ADC and travel; the open-source XLAT rig on an STM32F7 board for end-to-end click-to-photon latency. Firmware-side numbers and system-level numbers, cross-checked.

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USB HID

8 kHz polling

Analog / TMR switches

Per-key ADC

NKRO

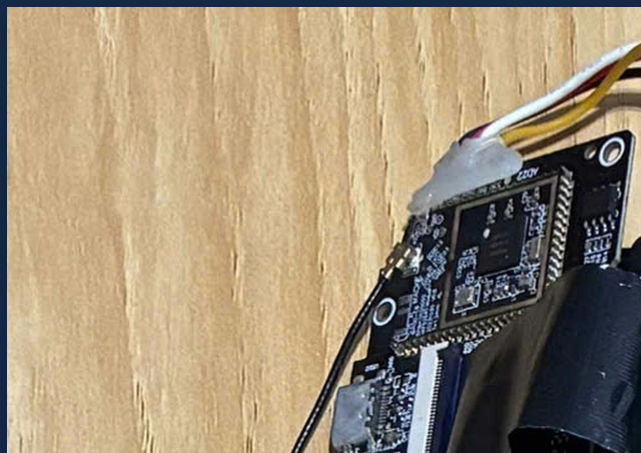
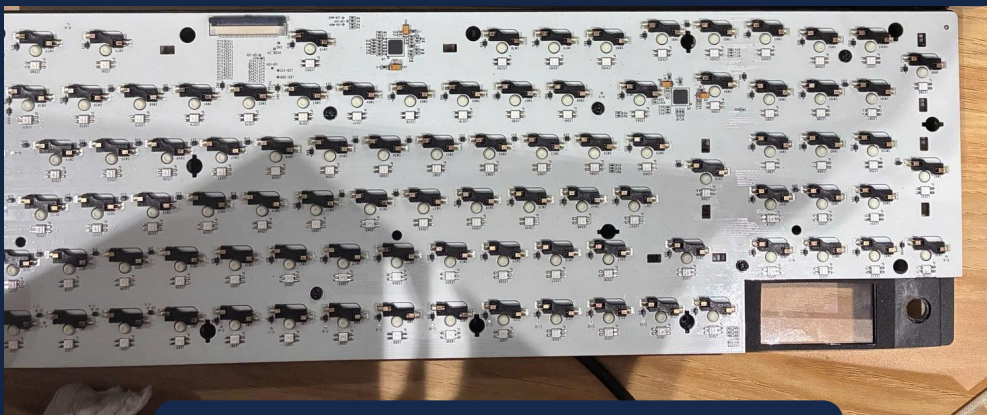
Rust

Slint

XLAT on STM32F7

Bring-up, on-device UI, wireless, and the line

The rest of the programme: everything between a bare PCB and a unit that can be built in volume.



Wireless daughterboard and antenna

1 Hardware bring-up

First power-on, rail and matrix verification, probing back to schematic, and the debug loop with the ODM's board revisions.

2 On-device display UI

An embedded GUI on the integrated panel — framebuffer over a serial link, asset pipeline and animation held inside the input latency budget.

3 Wireless variants

2.4 GHz and Bluetooth links with their own latency and power budgets, sharing one report pipeline with the wired path.

4 Secure OTA and line test

Firmware update through a WebAssembly web app — signed, encrypted, device-authenticated — plus test builds that let the factory screen boards.

Open-source keypad — our board, our firmware

A keypad platform we designed and built ourselves: schematic, layout, plate fit and firmware, published rather than filed away.



Assembled prototype — board, plate, stabilisers, encoder

1 Hardware we designed

Controller board with USB-C, key matrix and per-key LED footprints, a rotary encoder in the matrix, plate mounting and 2U stabiliser fit.

2 Firmware we wrote

USB HID enumeration, matrix scan and debounce, encoder decoding and key remapping — the same pipeline as our commercial input work, at a size a client can read in an afternoon.

3 Open by intent

Publishing the design means a prospective client can inspect our schematic, our layout and our source before signing anything. That is a faster trust route than any slide.

STACK

USB-C

USB HID

Key matrix scan

Rotary encoder

Per-key LEDs

Hot-swap sockets

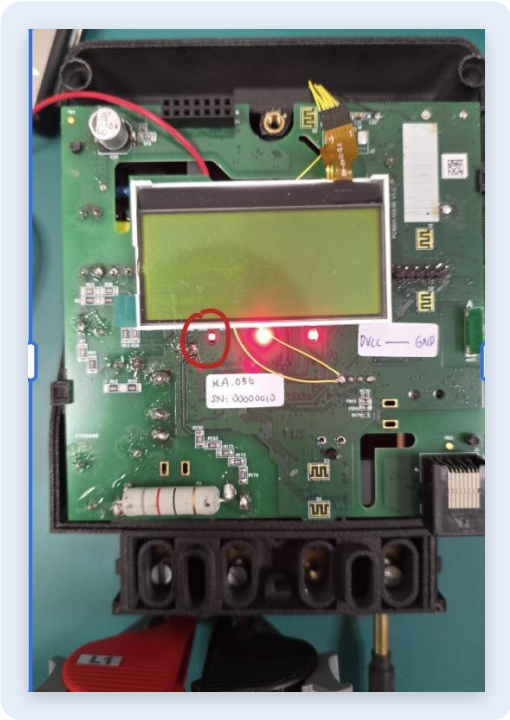
Open hardware

Smart meter development, bring-up to production firmware

Hardware bring-up, firmware implementation and purpose-built test firmware for a utility-grade smart meter programme.



Production meter — 3P4W HTCT, Class 0.5S



Bring-up on the bench — rails probed back to schematic

- 1

Hardware bring-up
First power-on, rail verification and probing the board back to schematic — the phase where a meter programme either finds its problems or ships them.
- 2

Firmware implementation
Metering firmware on the target: measurement path, LCD driving, push-button UI and WAN communication over the cellular link.
- 3

Firmware built for test
Purpose-built builds that exercise each subsystem so the line can screen boards — unglamorous work, and the reason volumes hold their yield.

STACK

3P4W HTCT

Class 0.5S

IS 15959 Part 3

4G / 2G WAN

LCD & keypad UI

Test firmware

Connected dog collar — location, activity, behaviour

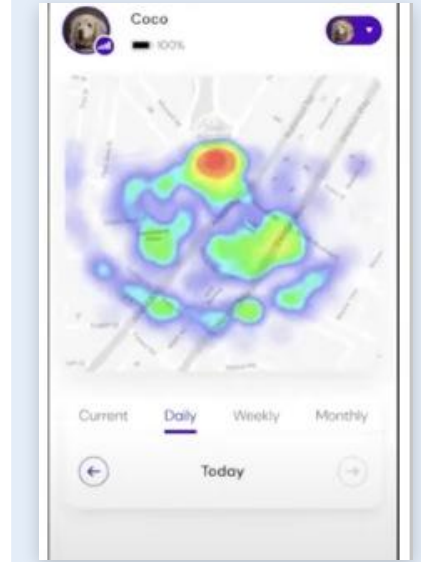
Hardware and firmware for a pet wearable: live position, step count and temperature, on a battery that has to survive a week on an animal.



Collar mainboard — cellular, BLE and charge management



The product in use



Movement heatmap

1 The board we built

Quectel cellular module, u-blox NORA-B106 for BLE, u.FL antenna feeds, USB-C with LiPo charge management, and an FPC link to the sensor board.

2 Power is the product

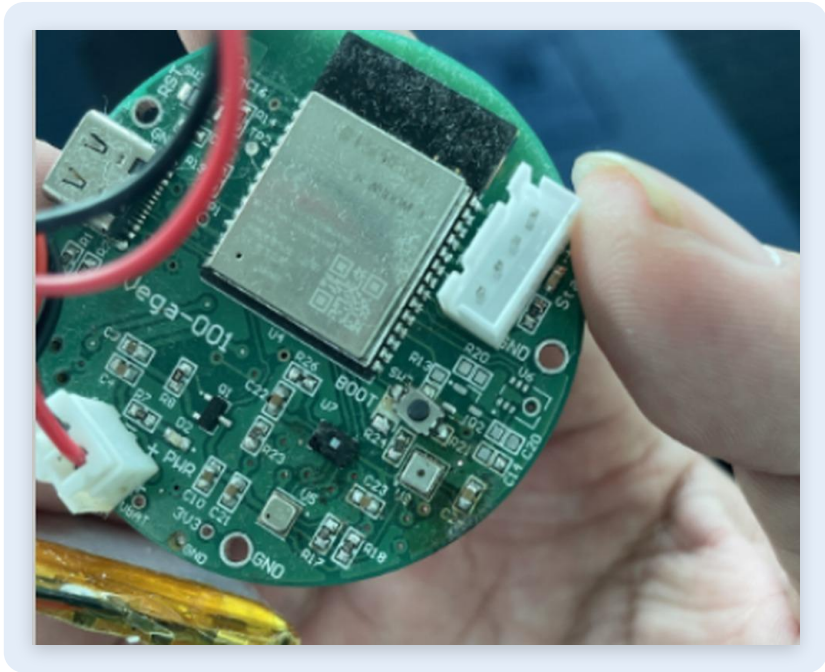
Duty-cycled position fixes and cellular reporting. The difference between a collar worn every day and one that lives on the charger is milliamps, not features.

3 Behaviour, not raw traces

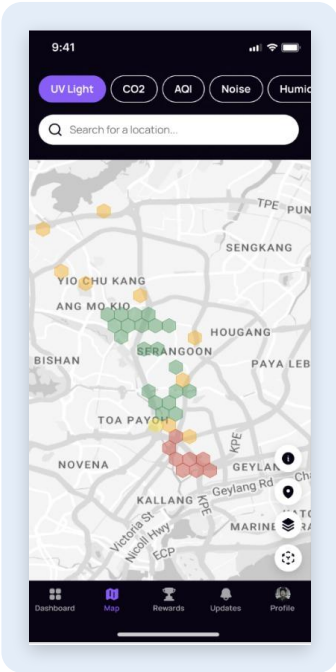
Steps, temperature and position rolled into daily, weekly and monthly views — plus a movement heatmap an owner can read at a glance.

Hyperlocal environmental sensing

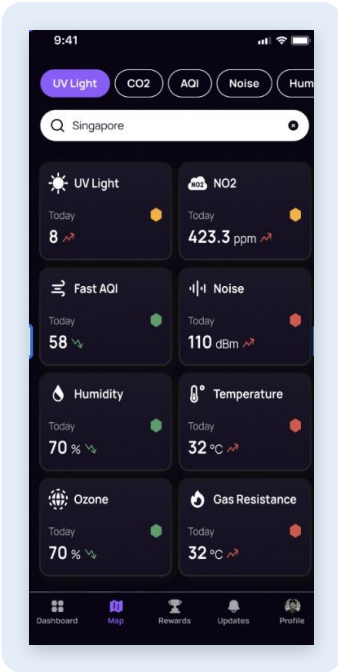
Compact nodes that turn a city into a live air, light and noise map — one street corner at a time.



MVP v2 — compact Wi-Fi/BLE sensing node



Hex-binned city map



Live metric dashboard

- 1

Two MVP generations

A modular v1 for sensor selection, then a compact round v2 with the radio, battery management and sensing on one board.
- 2

Eight signals per node

PM2.5, PM10, NO₂, ozone, UV index, sound pressure, humidity, temperature and gas resistance, on a duty-cycled power budget.
- 3

Density is the product

Readings are hex-binned into a live map, so a resident sees their own street instead of a citywide average.

STACK

ESP32 Wi-Fi/BLE

PM2.5 / PM10 / NO₂ / O₃

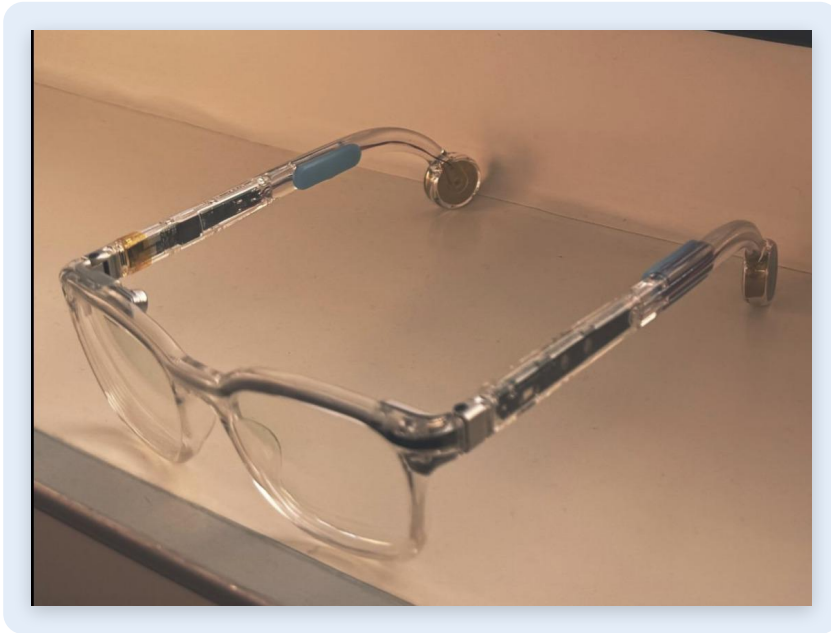
UV index

Sound pressure

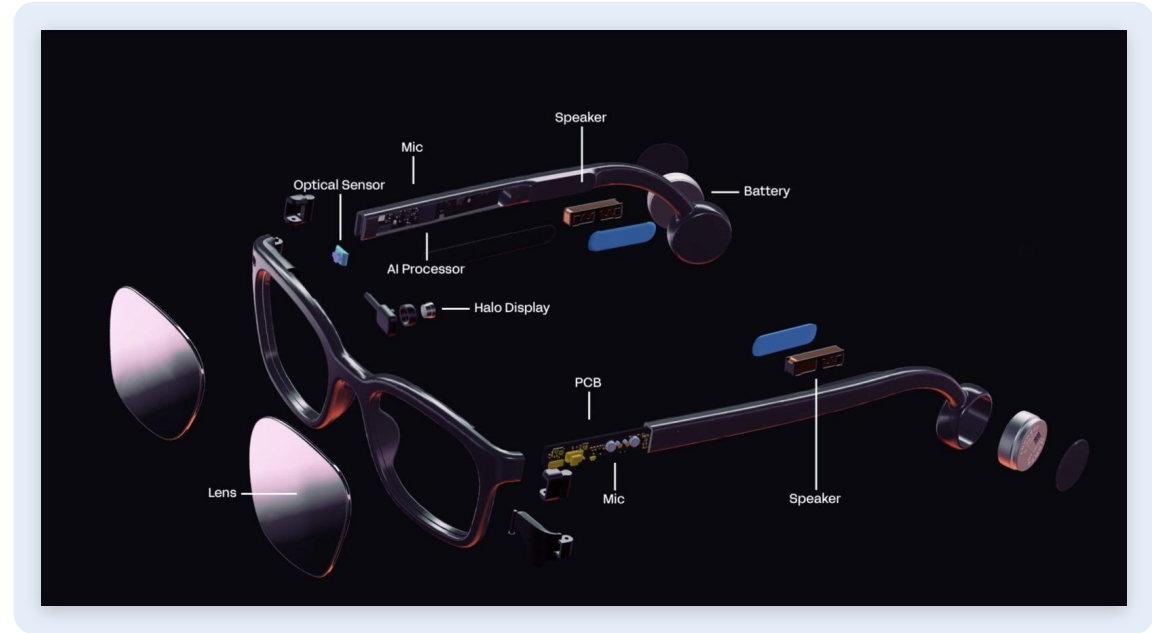
Mobile dashboard

Open-source smart glasses platform

Hardware and firmware for an open-source eyewear platform — electronics that have to disappear into a few millimetres of frame.



Clear-frame prototype — electronics visible in the temple



Platform architecture — sensing, audio, compute and power

1 Everything inside a temple arm

Flex PCB, battery, speaker, mic and optical sensing packed into an arm that still has to look like eyewear and sit on a face all day.

2 An open platform, not a locked device

Hardware and firmware published for the curious and the creative, so third parties can build on the platform rather than around it.

3 Comfortable at TRL 3–5

We take early-stage platform work, not only production programmes — and what we learn at that stage feeds straight back into the production stack.

What every device we ship gets for free

The fleet layer is built once and reused — you do not pay to reinvent it per programme.

1

Over-the-air updates

- Secure firmware upgrade for devices and ECUs
- Delivered via cloud or local server
- Rollback and version control

2

Remote diagnostics

- Real-time health of deployed devices
- Detect sensor failure, comms loss, overheating
- Metrics visualised in a cloud dashboard

3

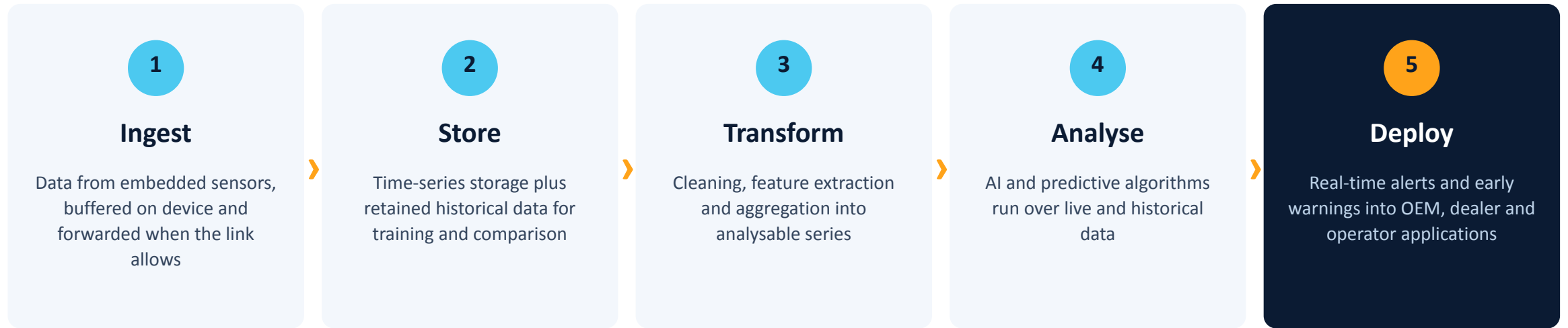
Remote services

- Parameter tuning: sampling rate, thresholds, triggers
- Server-initiated commands and status requests
- Predictive maintenance and support

Deployed in production across telematics, energy and consumer programmes.

From embedded sensor to early warning

The same pipeline behind our transformer monitoring, telematics fleets and Veeva's event diary.



Predictive maintenance is the commercial outcome: a failure detected two weeks early is a service call instead of a site visit, a recall, or an outage.

Embedded intelligence, not disconnected parts

Most suppliers own one layer and integrate badly at the seams. We own all of them — and we prove it on our own products.

A

We carry our own product risk

Veea is our camera: our silicon choice, our industrial design, our app, our cloud, our certification and our first batch. A client is buying a team that has already been through it, not one that has only advised on it.

B

One team from board to backend

Proprietary VCU and telematics stack, embedded AI, smart sensor integration and Flutter UI/UX — under one roof, so there is no integration gap where three vendors meet.

C

Two-country execution

Singapore for standards, market access and client proximity. Ho Chi Minh City for engineering depth at a cost base that lets a programme run longer on the same budget.

How to engage us

1

Full-stack product development

Concept to production

2

Custom AI integration

Intelligence at the edge of your hardware

3

Rapid prototyping

MVP built fast, then hardened

4

IoT & embedded consulting

Deep-tech guidance and audits

What clients get out of it

- Real-time remote visibility into product usage and performance
- Faster time to market via prototyping and modular systems
- Lower operational cost — up to 40% in deployments we have measured
- Longer product lifetime through predictive diagnostics
- Competitive differentiation through customised hardware intelligence

LET'S BUILD

BluLeap.ai

Let's build the future of connected technology together.

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